storm and pass inland as minor depressions, while the storm remained in the Pacific, reappearing again at short intervals. Also the end of the storms could be seen or would be indicated in a manner impossible to anticipate from the reports from coast stations.—*G. H. Willson.*

RIVERS AND FLOODS.

By H. C. FRANKENFIELD, Meteorologist.

There were two floods in the rivers of North Carolina during the month of February. The first was caused by rain combined with melting snow and high temperatures; involved the Roanoke, Tar, Neuse and Cape Fear Rivers, and began in the Roanoke River on February 4, extending over the Cape Fear River by February 8, and continuing in the lower Cape Fear until February 19. Stages were not unusually high. The second flood occurred from February 18 to 24, inclusive, and was due to heavy rains from February 13 to 16, inclusive, when the middle and lower reaches were still rather high from the previous flood. Except in the Roanoke River, the crest stages were slightly higher in the second flood than in the first.

Warnings for both floods were issued promptly and the reported losses amounted to only $10,000, while the value of property saved through the warnings was reported at $25,000.

The Peedee system of South Carolina was in flood coincidently with the second flood in the rivers of North Carolina, but the floods in the Santee system closely followed the heavy rains of the middle of the month.

These floods were more severe and the crest stages were from 4 to 9 feet above the flood stages. The Santee River had been in flood for some time past and the additional rains merely accentuated the conditions.

Considerable damage was done to bridges, fences, etc., mainly in the low country between Camden and Columbia. Live-stock losses were comparatively light.

Warnings were issued as occasion arose, and the reported value of property saved through them was $42,250. Losses amounted to $1,640, plus an unknown amount for prospective crops over 65 acres of overflowed lands.

The rains of the middle of the month were very general over the South, and the flood conditions were equally general. The flood stage of 32 feet was reached in the Savannah River at Augusta, Ga., during the night of February 16, but without resulting damage except a little that may have been caused by the inundation of some farm lands below Augusta.

Moderate floods also occurred in the other Georgia rivers for which warnings were issued at the proper time. In many places from 4 to 10 days advance notice was given, and much valuable property saved thereby, especially by lumber and cattle interests. Damage so far as reported was light.

In the Coosa, Cahaba, and Alabama Rivers of Alabama the floods were very moderate and presented nothing of special interest. The reported damage amounted to less than $1,000, and at least $5,000 worth of live stock was saved through the flood warnings.

In the Black Warrior and Tombigbee Rivers of Alabama the crest stages averaged from 1 to 3½ feet above flood stage. These floods were also well covered by warnings, and it was reported that thousands of cattle had been saved thereby. The floods were likewise of much benefit to lumbermen who depend upon them to move their timber. There was an earlier flood in the lower Tombigbee, but it passed off without incident.

Flood stages during February, 1922.

River and station.	Flood stage.	Above flood stages—dates. From—	To—	Crest. Stage.	Date.
ATLANTIC DRAINAGE.					
Roanoke:	*Feet.*			*Feet.*	
Weldon, N. C.	30	4	9	35.8	5,6
	30	17	18	34.0	18
Tar:					
Rocky Mount, N. C.	9	18	18	9.0	18
Tarboro, N. C.	18	9	11	18.7	10
	18	17	22	20.0	20, 21
Greenville, N. C.	14	9	13	15.0	11
	14	17	24	16.0	19-21
Neuse:					
Neuse, N. C.	14	3	10	18.6	6
	14	16	20	18.4	17
Smithfield, N. C.	14	4	11	17.6	8-10
	14	15	21	19.3	18
Cape Fear:					
Fayetteville, N. C.	35	16	19	47.0	17
Elizabethtown, N. C.	22	4	11	26.0	8,9
	22	16	22	32.2	19
Haw:					
Moncure, N. C.	22	16	16	24.0	16
Peedee:					
Cheraw, S. C.	27	15	18	35.0	17
Lynches:					
Effingham, S. C.	14	21	23	15.7	21
Santee:					
Rimini, S. C.	12	4	(1)	21.4	20
Ferguson, S. C.	12	5	(1)	15.8	21
Catawba:					
Catawba, S. C.	12	15	16	16.2	15
Wateree:					
Camden, S. C.	24	16	18	30.2	16
Congaree:					
Columbia, S. C.	15	16	18	22.2	17
Broad:					
Blairs, S. C.	15	15	17	20.3	16
Carlton, Ga.	11	15	16	16.0	15
Saluda:					
Pelzer, S. C.	7	15	16	8.4	16
Chappells, S. C.	14	8	8	14.7	8
	14	15	18	20.0	17
Savannah:					
Augusta, Ga.	32	16	16	32.0	16
Oconee:					
Milledgeville, Ga.	22	6	6	23.0	6
	22	17	18	23.3	18
Ocmulgee:					
Macon, Ga.	18	17	17	18.5	17
Abbeville, Ga.	11	11	16	12.7	13
	11	22	25	12.5	23,24
EAST GULF DRAINAGE.					
Apalachicola:					
Blountstown Fla.	15	6	26	19.7	19
River Junction, Fla.	12	7	12	16.4	9
	12	16	25	18.6	19
Chattahoochee:					
Columbus, Ga.	20	16	16	29.0	16
Alabama:					
Selma, Ala.	35	19	20	36.4	19
Coosa:					
Lock No. 4, Lincoln, Ala.	17	18	18	17.0	18
Etowah:					
Canton, Ga.	11	15	15	11.4	15
Tombigbee:					
Demopolis, Ala.	39	(2)	1	40.3	1
	39	6	10	41.8	8
	39	19	23	42.3	21
Black Warrior:					
Tuscaloosa, Ala.	46	16	17	49.4	17
Pearl:					
Columbia, Miss.	18	8	9	18.8	8
West Pearl:					
Pearl River, La.	13	4	17	14.6	7,8
GREAT LAKES DRAINAGE.					
Tittabawassee:					
Midland, Mich.	18	24	24	18.9	24
Pine:					
Alma, Mich.	6	23	27	8.2	25
MISSISSIPPI DRAINAGE.					
Kentucky:					
Beattyville, Ky.	30	20	21	35.0	21
Green:					
Lock No. 6, Brownsville, Ky.	30	22	24	33.0	24
Lock No. 4, Woodbury, Ky.	33	21	26	39.0	24
Lock No. 2, Rumsey, Ky.	34	25	(1)	35.6	28
Tennessee:					
Knoxville, Tenn.	12	16	17	14.7	16
Riverton, Ala.	32	20	21	32.4	21
Big Pigeon:					
Newport, Tenn.	6	16	16	6.6	16
PACIFIC DRAINAGE.					
Mokelumne:					
Bensons Ferry, Calif.	12	21	21	12.0	21

[1] Continued into March, 1922. [2] Continued from January, 1922.

Moderate local freshets early in the month over the Pascagoula system of Mississippi and Louisiana were well forecast and there was neither loss nor damage reported. Warnings were also issued for the flood stages that were reached during the third week of the month in the Tennessee River at Knoxville, Tenn., and Riverton, Ala., and in the upper Kentucky River. There was no damage reported.

The flood in the Barren and Green Rivers of Kentucky was somewhat more pronounced, and at the close of the month it was still in progress over the lower reaches. Warnings were issued well in advance of the flood and no damage was reported.

There were no other floods of consequence, although on account of heavy rains at headwaters and large accumulation of snow at lower levels, conditions became somewhat threatening early in the month in the Calaveras, Cosumnes, and Mokelumne Rivers of California. Due warning was given and no damage resulted.

MEAN LAKE LEVELS DURING FEBRUARY, 1922.

By UNITED STATES LAKE SURVEY.

[Detroit, Mich., Mar. 6, 1922.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes.[1]			
	Superior.	Michigan and Huron.	Erie.	Ontario.
Mean level during February, 1922:	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Above mean sea level at New York	601.43	579.23	571.17	244.70
Above or below—				
Mean stage of January, 1922	−.19	−.09	−.34	−.03
Mean stage of February, 1921	−.33	−.61	−.68	−.76
Average stage for February, last 10 years	−.48	−.76	−.47	−.83
Highest recorded February stage	−1.05	−3.49	−2.58	−2.97
Lowest recorded February stage	+.67	+.07	+.54	+.87
Average relation of the February level to:				
January level	.....	.00	−.10	.00
March level	.....	−.10	−.10	−.20

[1] Lake St. Clair's level: In February, 573.25 feet.

EFFECT OF WEATHER ON CORPS AND FARMING OPERATIONS, FEBRUARY, 1922.

By J. WARREN SMITH, Meteorologist.

The greater part of February, 1922, was extremely cold and unfavorable for stock and outdoor operations in the Northwestern States, especially in North Dakota and Montana. It was warm for the season in the Central and the Southern States where considerable farm work was accomplished, although there was some delay by frequent rains and wet soil in the Central and the East Gulf States. Field work was delayed in California by rains the latter part of the month, but some sugar-beet planting was done there and bean planting was begun. Some corn was planted in the Gulf States and cotton planting was begun in extreme southern Texas at about the average date.

The severe drought that had prevailed throughout the fall and winter months in the Southwest continued until the latter part of February, when it was brought to an end by general precipitation in most districts. Good snows occurred in Kansas and general rains were received in Oklahoma. Wheat and ranges were greatly benefited and material improvement was reported by the end of the month. The weather continued favorable for wheat and other fall-sown grains in the Central and the Eastern States and they continued generally in satisfactory condition in these sections.

Spring-oats seeding made satisfactory progress in the South the latter part of the month, but this work was stopped in the central Plains area by heavy precipitation during the last few days.

The month was favorable for the growth of most truck crops in the Gulf and South Atlantic States, except that some damage was done by frost in northern Florida and it was somewhat too warm there for celery and lettuce during the first part. Winter truck was badly injured by frost in California during the first week of the month.

The cold weather and snow-covered ranges were unfavorable for stock in the Northwestern States, the severe storm and extremely cold weather the latter part of the month being especially harmful. There was much loss of stock in North Dakota, and it suffered greatly in South Dakota, Montana, and Wyoming. The precipitation the latter part of the month caused marked improvement in ranges in most lower Great Plains grazing areas while pastures improved in the Central and the Southern States.

The mild weather developed fruit trees rather rapidly in the Southern States and by the close of the month early deciduous fruits were blooming in the Gulf Coast districts with a few blossoms coming out as far north as South Carolina. Fruit trees were badly damaged in the western Lake region by a severe ice storm the latter part of the month, especially in north-central Michigan where orchards were almost denuded of branches over considerable areas. Citrus fruit trees made good growth in Florida and produced a heavy bloom, while the harvest of navel oranges was general in southern California.